Using Data Mining and Historical Data Conversion Techniques to Support Environmental Health Decision Making

EPA Office of Research and Development's (ORD) Advanced Monitoring Initiative (AMI) and Global Earth Observation System of Systems (GEOSS): Assisting Decision Making in the Future by Quantifying the Past

Automatic Imagery Ortho-Rectification Pilot

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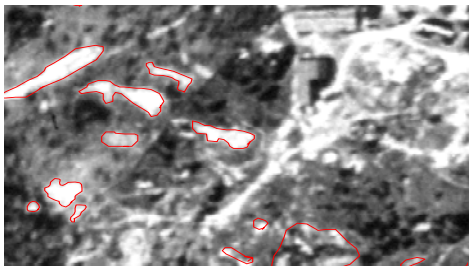
Issue: To realize the full potential of remote sensing information relevant to environmental decision-making, the enormous archives of historical analog remote sensing data must be converted to digital format and geo-referenced into a geodetic coordinate system.

Response: This research effort proposes to develop and test an automated, ortho-rectification process (AORP) that would enable the timely and cost-efficient geo-registration of analog and/or raw aerial photography and other remote sensing data, as well as the automated development of digital metadata.



A 1922 ortho-rectified aerial photograph of the American University Experiment Station where WW1 chemical weapons were developed and tested. Red GIS polygons represent unusual ground scars and disturbed earth.

A 1991 ortho-rectified aerial photo of the same area with a GIS overlay of the 1922 ground scar data The polygon areas, derived from the 1922 imagery, strongly correlated with areas of high soil arsenic, including the Child Development Center (in the middle of the photograph). Accurate ortho-rectification makes this type of analysis possible.

Outcome: By significantly increasing the base of historical remote sensing information and making it easily accessible via GIS/internet services, this research is expected to improve environmental decision making.

Arctic Coastal Integrated and Comprehensive Data Mining and Assessment Project

Authors: *Dixon Landers, EPA/ORD; Gretchen Hayslip, EPA/Region 10*

Issue: Historic arctic coastal datasets have been neither widely nor easily available for use in retrospective assessments.

Response: This project examines the usability of historic long-term environmental datasets for conducing *post hoc* Environmental Monitoring Program (EMAP) assessments.

Outcome: Evaluating qualified historic data sets using an EMAP sampling approach will allow Alaska resource managers the ability to identify and understand possible trends and changes in status that have occurred in Alaska's coastal ecosystems over time.

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